

Maternal Responsiveness Protects Exuberant Toddlers from  
Developing Behavior Problems in Kindergarten

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## EXUBERANCE, RESPONSIVENESS, SCHOOL BEHAVIOR PROBLEMS

### **Abstract**

*Research Findings:* Exuberant temperament, characterized by high approach and positive affect, is linked to socioemotional outcomes including risk for externalizing symptoms across development. Externalizing problems interfere with children's school readiness and lead to disruptive behavior in the classroom. While some moderating factors help identify which exuberant children are at risk and in which contexts they are at risk, few studies have identified early moderators that protect against maladjustment when children enter school. In the current study, we examined exuberant temperament in 124 toddlers and classroom behavior problems reported by kindergarten teachers. We also assessed the impact of maternal responsiveness at 24 months on the relation between exuberance and classroom behavior problems. As hypothesized, we found that higher exuberance predicted more behavior problems. Additionally, maternal responsiveness moderated this association such that high responsiveness protected exuberant children from classroom behavior problems.

*Practice or Policy:* These results expand our understanding of socioemotional risks for exuberant children and how these risks influence school readiness. We also find that maternal responsiveness during toddlerhood mitigates these risks, and our findings suggest that interventions for exuberant children at risk for behavior problems or poor school readiness should target parental responsiveness when children are toddlers.

*Keywords:* exuberance, responsive parenting, school behavior problems

### Maternal Responsiveness Protects Exuberant Toddlers from Developing Behavior Problems in Kindergarten

When children enter school, they are expected to meet a number of new cognitive, emotional, and behavioral demands, all of which contribute to school readiness and continuing academic success. Children in kindergarten, for example, are expected to learn new skills, interact positively with classmates, and follow their teachers' directions. While some children have little difficulty meeting these expectations, many have trouble managing these new demands. There are a number of factors that can account for why and how children struggle in the transition to school (Rimm-Kaufman, Pianta, & Cox, 2000). Temperament, or a child's early predisposition for emotion reactivity and regulation (Rothbart & Bates, 2006), can influence individual differences in children's adjustment to kindergarten (Buss, 2011; Sanson et al., 2009). For instance, exuberant children, identified as high in approach behaviors and high in positive affect may have difficulties inhibiting their behaviors and activity levels and may therefore become easily frustrated with limits (Putnam & Stifter, 2005). Children who are exuberant do not all develop the same socioemotional outcomes (Dollar, Stifter, & Buss, 2017; Stifter, Putnam, & Jahromi, 2008); in particular, we know that parenting plays an important role in the development of socioemotional development and has also been found to moderate risk trajectories (Blair & Raver, 2015; Davis & Buss, 2012; Eisenberg et al., 2005; Jahromi, Putnam, & Stifter, 2004). Less is known about how these early characteristics and contexts influence children's transitions in school.

Our current study sought to address the influence of early temperament and parenting behaviors during toddlerhood on children's behavior problems during kindergarten. The first aim was to examine the role of early exuberant temperament in its relation to behavior problems

in the transition to kindergarten. The second aim of the study was to identify early parenting behaviors that might reduce the risk for behavior problems in exuberant children.

### **Impacts and Influences of Early School Readiness**

When children enter preschool and kindergarten, school readiness goes beyond mastering academic skills and includes a number of socioemotional skills that are essential for learning (Denham & Brown, 2010). Socioemotional skills important for school readiness include: emotion knowledge; self-awareness; emotion regulation; and attentional and behavioral processes that help set children up for success in the transition to school (Denham, Bassett, Zinsser, & Wyatt, 2014; Graziano, Reavis, Keane, & Calkins, 2007). The first few years of school can be formative experiences toward future academic success for young children (Deater-Deckard, Mullineaux, Petrill, & Thompson, 2009; Duncan et al., 2007). Children who can follow the rules of the classroom, play well with others, and stay on task enter kindergarten more prepared both behaviorally and academically and are better set up to be successful throughout elementary school (Duncan et al., 2007; Eisenberg, Valiente, & Eggum, 2010; Graziano et al., 2007; Konold & Pianta, 2005). While we are aware of many risks that might impede early successful adjustment to school, we also know that there are ways to mitigate these risks early on in preschool (Bierman et al., 2008). For example, children who received a socioemotional and literacy intervention (Head Start REDI) in preschool performed better academically into kindergarten and through to fifth grade (Bierman, Nix, Domitrovich, Welsh, & Gest, 2015).

Both the academic and socioemotional skills necessary for school readiness are determined by a number of characteristics and experiences even before children enter school. Attention, self-regulation, as well as broader temperamental characteristics, such as fearfulness or exuberance, have been shown to influence the development of social, emotional, and

behavioral skills (Dollar & Buss, 2014; Liew, 2012). Early individual differences in the expression and regulation of emotions and behavior, otherwise known as temperament, have been largely shown to predict both proximal outcomes (e.g., externalizing problems in early childhood; Abulizi et al., 2017; Degnan et al., 2011) and more distal outcomes (e.g., conduct disorder in adolescence; Frick & Morris, 2004). These temperamental characteristics can also influence academic outcomes such as the development of early literacy skills. Deater-Deckard and colleagues (2009), for example, found that effortful control associated with early regulatory skills is related to better attainment of early literacy skills, but this was only for children who were also low in surgency. Surgency, which is associated with high impulsivity and activity level, interferes with the benefits that effortful control might contribute to the development of early literacy (Deater-Deckard et al., 2009).

While many children are able to adjust well to the new demands of entering school, others might struggle with externalizing problems such as impulsive behaviors or difficulty following teacher directions (Zhou et al., 2007). These behaviors can reflect poor socioemotional skills such as self-regulation, which can be addressed early before they become larger issues as children get older. In a classroom intervention, Flook and colleagues (2015) found that a mindfulness curriculum in preschool can improve teacher reported socioemotional skills. Many school readiness interventions address preschool and school age children but it is possible that we can disrupt maladaptive developmental trajectories for socioemotional skills before children even enter school. For instance, we know that parenting during infancy and toddlerhood and parent-toddler relationships can shape individual trajectories for socioemotional development (Kochanska, Aksan, & Joy, 2007; Smith, Calkins, Keane, Anastopoulos, & Shelton, 2004). Further, parental scaffolding or involvement, characterized as responsiveness, can help children

develop important socioemotional skills through emotion socialization and can help children determine how to express their emotions and behave appropriately in different contexts (Eisenberg et al., 2010). While the links between parents and socioemotional skills during the first few years of life are well known, little work has identified how these early parenting behaviors might mitigate risks that impact individual children's experiences in school. Specifically, can parenting behaviors reduce risks children might face upon entering school? In one early intervention program designed by Bierman, Welsh et al. (2015), they found that parental involvement in reading and other at-home activities during preschool and kindergarten promoted better academic success by the end of kindergarten. However, these results were only found for parents who were rated as more supportive before the intervention (Mathis & Bierman, 2015).

Is it that supportive or responsive parenting when children are toddlers can have a greater impact on socioemotional adjustment than when children are school-aged, particularly those at a higher risk for maladjustment? Parents play an important role in toddlerhood in setting healthy developmental trajectories of socioemotional functioning that can later impact school adjustment or readiness (Bernier, Carlson, & Whipple, 2010; Cipriano & Stifter, 2010; Landry, Smith, Swank, Assel, & Vellet, 2001). We set out to address how and when parenting behaviors protect against risks that exuberant children face in the transition to school. In the current study, we address whether maternal responsiveness during toddlerhood influences school adjustment for children at a temperamental risk for behavior problems as compared to responsiveness when the children are older.

### **Influence of Temperament and Parenting on Socioemotional Development**

A child's temperament is known to influence a number of socioemotional outcomes, particularly in early childhood (Kagan & Fox, 2006; Rothbart & Bates, 2006). Temperament refers to the biological predisposition toward reactivity and regulation that influences children's affect, attention, and activity. There are many approaches to studying and measuring temperament (Goldsmith et al., 1987), and it is largely understood that there are several dimensions of reactivity and regulation that make up temperament in children (Rothbart, Ahadi, Hershey, & Fisher, 2001). Specifically, Rothbart and colleagues (2001) identified three dimensions of temperament; extraversion/surgency (approach behaviors), negative affectivity (fear, anger, sadness), and effortful control (self-regulation). These three dimensions and the characteristics that make up each dimension have been extensively studied and shown to influence numerous socioemotional outcomes in children (Putnam & Stifter, 2005; Rothbart & Bates, 2006; Rothbart et al., 2001).

We know that one characteristic in young children that is a risk for school readiness is exuberant temperament. Exuberant temperament is characterized as high approach and high positivity, often measured in the presence of novelty, and is associated with a number of socioemotional outcomes (Dollar, Stifter, & Buss, 2017; Putnam & Stifter, 2005; Stifter, Putnam, & Jahromi, 2008). While exuberance is also closely related to low fearfulness or fearlessness in young children (Kochanska et al., 2007), it is not fully captured by these measures (Dollar et al., 2017). When children are exuberant, they are more likely to have high levels of approach in new situations; high levels of activity; and high levels of positivity (Putnam & Stifter, 2005; Dollar & Buss, 2014). However, these children are also more easily frustrated when their goals are blocked and display externalizing problems (Degnan et al., 2011). Due to their predisposition, exuberant children are at risk for developing behavior problems in the face of frustration such as

aggressive behaviors or difficulty following directions (Dollar et al., 2017; Stifter et al., 2008).

While exuberant temperamental traits do predict externalizing problems, the development of healthy socioemotional skills can mitigate this risk (Blair & Raver, 2015; Eisenberg et al., 2010).

A number of moderators have been shown to influence the risk trajectory of exuberant children. Children's own characteristics, such as positivity or regulation, have been shown to impact the trajectories of children who are high in approach or exuberance. Dollar and Buss (2014) for instance, found that toddlers high in approach were rated as having more externalizing problems only when they also were higher in positivity. Another moderator for exuberant temperament is regulation. Stifter and colleagues (2008), found that children characterized as exuberant at the age of 2 years were more likely to display externalizing problems by the age of 4.5 years when they were low on measures of regulation. Dollar and colleagues (2017) extended this work on the direct influence of adjustment in schools, specifically social adjustment. Exuberant toddlers who also had high inhibitory control (i.e., behavior regulation) were rated highest in their peer acceptance by mothers while exuberant toddlers with low inhibitory control were rated as having the lowest peer acceptance (Dollar et al., 2017). Their results suggest that while early temperamental characteristics can predict later externalizing risks in school-age children, these risks can be moderated by the children's own characteristics.

Parents can play an important role in the development of both emotional reactivity and regulation, especially during infancy and toddlerhood, and have also been shown to moderate trajectories for children at temperamental risks for poor socioemotional outcomes (Jaffe, Gullone, & Hughes, 2010; Smith et al., 2004). Parents impact the development of socioemotional outcomes first in infancy through their responsiveness to infant distress (Haley & Stansbury, 2003; Jahromi et al., 2004; Landry et al., 2001). As toddlers begin to explore their environment,



parents provide important boundaries; teach children when it is necessary to comply with adults; and teach children appropriate behaviors and strategies for expressing their own emotions (Dennis, 2006; Spinrad et al., 2004). Eisenberg and colleagues (2010) explain in their review of work on child self-regulation how parenting, particularly responsive parenting, provides a context in which children develop adaptive socioemotional skills. Responsive or supportive parenting is also associated with positive parent-child interactions, and Kochanska and colleagues (2007) demonstrate that responsive parenting is especially important for positive socioemotional development in children who are low in fear.

Supportive or responsive parenting has a differential impact on outcomes for different temperamental characteristics (Davis & Buss 2012; Kochanska et al., 2007; Lengua, 2006; Root & Stifter, 2010). As discussed previously, responsive parenting is especially important during toddlerhood to mitigate socioemotional risks for children (Landry et al., 2001). Parents who are involved and respond to the individual needs of children can provide a safe context through which young children interact with their environment. Davis and Buss (2012) found that for shy children at risk for social withdrawal and internalizing problems, supportive maternal emotion socialization is related to those children having more positive peer interactions (Davis & Buss, 2012). Root and Stifter (2010) found that for exuberant children who are at risk for behavior problems and externalizing symptoms, endorsement of supportive emotion socialization when children were 4.5 years old is associated with fewer problems in the classroom at the age of 7 years. However, no studies have examined how both observed and reported maternal responsiveness during toddlerhood influences socioemotional outcomes during the transition to school for exuberant children.

While exuberant children might differentially benefit from responsive parenting, these benefits could also depend on the timing in which mothers are responsive to their children's individual needs. Landry and colleagues (2001) assessed the effect and timing of maternal responsiveness during infancy and early childhood. They found four groups of mothers; one group who remained highly responsive in infancy and early childhood; a second group who was high responsive in infancy and low in early childhood; a third group who was low responsive in infancy and moderately responsive in early childhood; and a fourth group who was consistently low in responsiveness in both infancy and early childhood (Landry et al., 2001). The authors assessed the influence of these patterns of responsiveness on children's social behaviors and found that there was less social growth when mothers were low-moderate or low-low in responsiveness. There was no difference, however, in the social development between children whose mothers were high responsive during infancy and early childhood or only high responsive in infancy but low in early childhood (Landry et al., 2001). These findings suggest that early responsiveness might have a particularly important role on socioemotional development in children. As they enter school, children must be able to internalize these skills and strategies and use them independent of their parents. Children who do not learn these strategies, especially exuberant children at risk for behavior problems, have a difficult time transitioning to the classroom and meeting the social and academic demands of school (Blair & Raver, 2015; Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009).

### **The Present Study**

In the current study, we examined the impact of responsive parenting on temperamental risks that exuberant children face that could cause maladjustment in kindergarten. The first aim of the current study was to examine the effect of observed exuberant temperament on later

behavior problems in school. We hypothesized that children higher in exuberance as toddlers would be reported as having more problem behaviors by their kindergarten teachers. The second aim of the study was to assess whether responsive parenting might protect these exuberant children against developing classroom behavior problems. We hypothesized that maternal responsiveness would moderate the relation between exuberance and problem behaviors, such that exuberant children with more responsive mothers will have fewer behavior problems than exuberant children with less responsive mothers. We also conducted post-hoc analyses to determine the differential impact of responsiveness on children low and high in exuberance and whether the responsive parenting during early childhood has the same impact as responsiveness during toddlerhood.

## **Method**

### **Participants**

One hundred and twenty-four, 24-month-old children and their mothers were recruited for a larger longitudinal study (Buss, Davis, Ram, & Coccia, 2017) through recorded local birth announcements ( $M_{age} = 24.43$  months,  $SD_{age} = 0.47$  months; 61 female). A majority of the sample was middle class (incomes ranging from <\$15,000 (3%) to > \$60,000 (49%) with most families (90%) earning more than \$30,000) and largely White (90.4 White, 6.4% Asian-American, 1.6% Native American, and 0.8% Hispanic and African-American).

### **Procedures**

During the initial 24-month laboratory visit, mothers and their children visited the laboratory and participated in a series of episodes, including six novel tasks. Mothers also completed a series of questionnaires about their children and their parenting. During the fall of

kindergarten, mothers completed questionnaires and teachers completed a number of measures to assess children's socioemotional adjustment in the classroom.

**Novel Episodes.** These tasks included low-threat episodes (Clown and Puppet Show), medium threat episodes (Stranger Working and Stranger Approach) and high-threat episodes (Robot and Spider) developed out of the Laboratory Temperament Assessment Battery (Lab-TAB) and previous studies designed to observe toddler behavior (Goldsmith, Reilly, Lemery, Longley, & Prescott, 1994; Buss & Goldsmith, 2000). The two low-threat episodes (Clown and Puppet Show), involved a second experimenter dressed as a clown or using puppets behind a stage who then enthusiastically asked the toddler to play a series of short games. The medium-threat episodes involved either a female stranger working in the room for 2 minutes (Stranger Working) or a male stranger who began a short conversation with the toddler (Stranger Approach). Finally, the high threat episodes (Robot and Spider) involved remote controlled toys, a robot and a large spider attached to a truck in the corner that approached the toddler and then retreated two times with 10 seconds in between each movement. For more detail on the coding system, refer to previous studies (Buss, 2011; Buss et al., 2017).

## Measures

**Exuberance Coding.** Global scores of boldness and positive affect were coded from each of the 6 episodes at age 24 months (Table 1). For boldness, raters were instructed to code the level of boldness the child displayed in each episode. The ratings ranged from 1 – the child displays no boldness, remains neutral, or remains in their mother's lap to 5 – the child takes initiative during the episode, makes many attempts to interact with the stimulus, and seems comfortable throughout the episode. Boldness ratings across the six episodes were averaged to create a total score of observed exuberance. For the positive affect coding, raters were instructed

to code positive facial affect or positive vocalizations, including smiling, laughter, excited clapping, or other behaviors associated with positive affect. The ratings ranged from 1 – the child shows no positive affect to 5 – the child displays positive affect that lasts the whole episode. Coders achieved reliability of kappa (or percent agreement) = 0.80 with the master coder prior to coding these measures independently. Throughout the coding of the six episodes, reliability on about 15-20% of the cases was assessed to avoid coder drift (percent agreement > 0.90). The reliability was relatively high across the six episodes for boldness ( $\alpha = 0.69$ ) and for positive affect ( $\alpha = 0.68$ ). We combined average boldness ratings and average positive affect ratings across the six episodes using principal components analysis (PCA). Average boldness and average positive affect were highly correlated (0.66) and created a one factor composite with a factor loading = 0.91.

**Maternal Responsiveness.** To measure responsiveness, we combined two measures of involvement, the warmth-involvement subscale from the Parenting Practices Questionnaire (PPQ; Robinson, Mandleco, Olsen, & Hart, 1995) and coder ratings of observed involvement during the 6 episodes conducted in the lab (Table 1). We used parent reported warmth-involvement to get at overall responsiveness as reported by the mother. We used the observed involvement to capture how parents behave in the novel episodes. The warmth-involvement subscale includes 11 items (e.g., Gives praise when child is good; Responsive to child's feelings or needs) rated on a scale of exhibiting behaviors from 1 – Never to 5 – Always ( $\alpha = 0.56$ ). We also used the mean scores of observed maternal involvement during the 6 episodes. Involvement during the episodes was defined as the participation in the activities without the child's requesting their involvement. Coders rated maternal involvement on a scale of 0 – “no involved behavior” to 3 – “caregiver is very involved in activity; caregiver has a central role in child's

play.” It is important to note that parents were asked to refrain from interacting with their child as much as possible during each episode, therefore making involved parenting behaviors fewer than what might normally occur between parents and children. Again, coders achieved reliability of kappa (or percent agreement) = .80 with the master coder prior to coding these measures independently and we assessed reliability on about 15-20% of the cases to avoid coder drift. The reliability across the six episodes for maternal involvement ( $\alpha = 0.30$ ) was relatively low due to the different tasks and behaviors meant to be elicited in each episode. We created a maternal responsiveness composite through PCA using the observed involvement and the PPQ warmth/involvement scale. These measures had low correlation (0.20) but created a one factor model with a loading = 0.77

**Classroom Problems.** Teachers reported the number of problems the children displayed in the classroom in the spring of kindergarten using the Teacher Observation of Child Adaptation-Revised (TOCA-R; Rains, 2003). Teachers rated children’s behaviors on a scale of 1 – almost never to 5 – almost always on 16 items such as “Breaks rules,” “Teases classmates,” and reverse scored items such as “Completes assignments” and “Friendly.” A higher score indicated more problem behaviors in the classroom. The current study used the total number of classroom behavior problems reported by teachers (Table 1;  $\alpha = 0.89$ ). We then standardized total problems to use in the models (Table 2).

**Covariates.** We controlled for a number of covariates to better address our question of the influence of exuberant temperament on classroom behavior problems and the moderation of maternal responsiveness specifically at 24 months. We controlled for fearful temperament using the object fear ( $\alpha = 0.74$ ) and social fear ( $\alpha = 0.82$ ) scales taken from the Toddler Behavior Assessment Questionnaire (TBAQ; Goldsmith, 1996). We also controlled for overall responsive

parenting style at age 5 using the PPQ authoritative scale ( $\alpha = 0.82$ ). We also used this scale to conduct a post-hoc test to determine whether the moderation effect of responsive parenting occurs at age 5. Finally, we controlled for gender, child's race, and family income levels. Income was measured using a scale of 1 – makes below \$15,000 to 7 – makes above \$61,000.

### **Analytic Approach**

The pattern of missing data was not dependent on observed data (Little's MCAR test:  $\chi^2(6) = 11.27, p = 0.67$ ) and no evidence suggests a violation of missing-completely-at-random. We therefore used multiple imputation (MI: Graham, Olchowski, & Gilreath, 2007) to account for the missing data in the MICE package in R (van Buuren & Groothuis-Oudshoorn, 2011). Missing data percentages and descriptive statistics of the variables that went into the composites and the models are presented in Table 1. Missing data was caused by participant drop out during the course of the study as well as difficulty getting different reporters (e.g., teachers) to complete the measures and there were no differences in exuberance or involvement scores between families with data from kindergarten teachers and families without ( $F_{exuberance} = 1.14, p = 0.29$ ;  $F_{involvement} = 2.23, p = 0.64$ ) Therefore, we imputed 50 datasets using the measures and composites included in the regression models. The complete case analyses (i.e., listwise deletion) and analyses of pooled MI data yielded the same results. Outliers were kept in the model as they were not bivariate outliers and did not change the patterns of the findings. We tested the hypotheses through multiple linear regressions and used pooled estimates from the imputed datasets. Finally, we tested a number of post hoc analyses to examine the specificity of our findings to the hypothesized parenting constructs.

### **Results**

Descriptive statistics and correlations for the child exuberance composite, maternal responsiveness composite, and classroom adaptation as well as the covariates of income level, TBAQ social fear, TBAQ object fear, and the PPQ authoritative scale at age 5 years are presented in Table 2. In general, mothers in the current sample reported being high in responsiveness ( $M_{PPQ} = 4.41$ , Range = 3.64 – 5.00) and children were reported as having few problems in the classroom ( $M_{TOCA-R} = 0.40$ , Range = 0 – 2.31). Toddler exuberance was significantly associated with the TBAQ social fear scale and later classroom problems. Maternal responsiveness, on the other hand, was not correlated with classroom problems, but was correlated with the PPQ authoritative scale at age 5. Child exuberance and maternal responsiveness were also correlated, and upon examination this correlation is not an artifact of the composites. Income was not correlated with the variables of interest. We ran one-way ANOVAs to determine the association between child race and gender and temperament, responsiveness, and classroom behavior problems. While race ( $F_{exuberance} = 3.37$ ,  $p = 0.01$ ;  $F_{responsiveness} = 0.98$ ,  $p = 0.40$ ;  $F_{behavior\ problems} = 3.07$ ,  $p = 0.05$ ) was significantly associated with exuberant temperament and behavior problems, gender ( $F_{exuberance} = 0.93$ ,  $p = 0.34$ ;  $F_{responsiveness} = 0.003$ ,  $p = 0.96$ ;  $F_{behavior\ problems} = 0.13$ ,  $p = 0.71$ ) was not associated with any of the three variables in the model. Nevertheless, we included both race and gender in the analyses below.

First, we tested the association between exuberance at 24 months and behavior problems in kindergarten (Table 3, Model 1) while controlling for the covariates discussed above. As predicted, we found that exuberance was significantly related to teacher reported problems in the classroom ( $\beta = 0.17$ ,  $p = 0.04$ ). Thus, higher exuberance at age 24 months was associated with higher teacher-reported behavior problems when children were in kindergarten.



Next, we included maternal responsiveness and the interaction between maternal responsiveness and exuberance in the model (Table 3, Model 2), controlling for mother reported authoritative parenting style at age 5. While responsiveness did not predict behavior problems in the classroom, it did moderate the relation between exuberance and teacher-reported problems ( $\beta = -0.17, p = 0.04$ ). To better understand this moderation, we pooled together the imputed datasets and plotted the results in Figure 1. We split maternal responsiveness by low responsiveness ( $-0.5\ sd$ ), average responsiveness (between  $-0.5\ sd$  and  $+0.5\ sd$ ), and high responsiveness ( $+0.5\ sd$ ). Using simple slopes analyses of these groups, we found that exuberance predicted classroom behavior problems for children whose mothers were low in responsiveness ( $\beta = 0.31, p = 0.03$ ). Exuberance did not predict classroom behavior problems when mothers were average or high in responsiveness ( $\beta = 0.13, p = 0.25, \beta = 0.08, p = 0.24$ ). Thus, average and high maternal responsiveness during toddlerhood may protect exuberant children from problem behaviors in kindergarten. (Figure 1). It is important to note that the shape in Figure 1 suggests a potential increase in behavioral variability among more exuberant children. While it is beyond the scope of the current study, this could be important for future work on exuberant temperament.

We ran further post-hoc analyses to test the specificity of our findings in exuberant temperament and maternal responsiveness during toddlerhood compared to other timepoints and other parenting styles and strategies. We assessed the different effects of responsiveness for children with low and high exuberant temperament. First, we split the data set between children low and high in exuberance to test whether responsiveness had differential effects on classroom behavior problems for these two groups. In this, post-hoc analysis, we found that children who were low in exuberance, maternal responsiveness was not associated with classroom behavior

problems ( $\beta = -0.03, p = 0.65$ ). For children high in exuberance, however, maternal responsiveness was associated with a reduction in classroom behavior problems ( $\beta = -0.31, p = 0.03$ ). These results suggest that maternal responsiveness is particularly impactful for school readiness in children who are high in exuberance.

We also set out to examine whether the timing of responsive parenting strategies is important in influencing behavior problems in the classroom. To test this hypothesis, we conducted a post-hoc analysis to assess the concurrent impact of authoritative parenting style on the relation between exuberant temperament and behavior problems in the classroom. We used the Parenting Practices Questionnaire authoritative subscale completed by mothers when their children were in kindergarten. We used the same exuberance and classroom behavior problems measures used in the main analyses and controlled for maternal responsiveness at 24 months. The results of these analyses showed no interaction effect between authoritative parenting style, exuberance, and behavior problems ( $\beta = 0.01, p = 0.64$ ). Our findings suggest that responsiveness as a parenting strategy may be especially important when children are toddlers compared to when children are older. Toddlerhood, therefore, could be an important stage for parents to influence the development of socioemotional skills, such as self-regulation, (Cole et al., 2011; Landry et al., 2008; Spinrad et al., 2007).

Finally, we ran an additional set of moderation models using other parenting variables assessed when children were toddlers, including authoritarian and punitive parenting styles and strategies (PPQ; Robinson et al., 1995). We found no significant interaction effects for authoritarian parenting ( $\beta = -0.73, p = 0.18$ ) nor punitive parenting ( $\beta = -0.0004, p = 0.99$ ). These findings suggest that responsive parenting, rather than harsh parenting or punishment, is

particularly important for children with exuberant temperament in preventing later behavior problems.

### **Discussion**

Early temperament and parenting can help to shape children's socioemotional development and, in turn, influence early school experiences. These experiences set children on trajectories that can determine school readiness and success, especially with respect to behavioral adjustment in school. The current study was able to show a significant relation between exuberant temperament during toddlerhood and teacher reported behavior problems in kindergarten. As we hypothesized, higher exuberance in toddlers predicted more behavior problems during the spring of kindergarten. We were also able to show the influence of maternal responsiveness on the risk for behavior problems for exuberant children. Specifically, we found that the relation between exuberant temperament and behavior problems was moderated by maternal responsiveness, such that higher exuberance predicted behavior problems only when mothers were less responsive to their toddlers. When mothers were more responsive, exuberance was not associated with teacher-reported problems during kindergarten.

These findings build on previous work of temperamental risks (Stifter et al., 2008; Dollar et al., 2017) and the importance of the role of maternal responsiveness for exuberant children in helping to prevent these risks (Landry et al., 2001; Lengua & Kovacs, 2005). Importantly, we demonstrated that early temperament relates to how teachers rate children's behavior problems well into kindergarten. Previous research has consistently found that early exuberance predicts more externalizing problems (Dollar & Buss, 2014; Putnam & Stifter, 2005; Stifter et al., 2008). The current study adds to this literature, as we found early exuberance posed a risk for children in adjusting to the behavioral demands of the classroom and behavior problems in school.

Specifically, we found that higher ratings of exuberance at the age of 24 months predicted more behavior problems as reported by teachers in the spring of kindergarten. Like previous work, this study supports the notion that exuberant temperament is a particular risk for disruptive behaviors, especially in the classroom (Root & Stifter, 2010).

Furthermore, we found support for the effect of maternal responsiveness in protecting children against this risk for behavior problems. In our study, we found that exuberance no longer predicted behavior problems when mothers were highly responsive to their toddlers. Again, this impact of maternal responsiveness is consistent with parenting and temperament literature (Haley & Stansbury, 2003; Kochanska et al., 2007; Landry et al., 2001). In post-hoc analyses, we found that responsiveness was associated with fewer classroom behavior problems only for children who were high in exuberance. These results suggest that responsive parenting strategies are particularly important for children who are high in approach and positivity and who are potentially more at risk for behavior problems. As Eisenberg and colleagues (2010) suggest, maternal responsiveness can help toddlers by scaffolding appropriate behaviors and setting limits for toddlers to learn.

We also found that the timing of responsive parenting might be particularly important for reducing the risk for behavior problems in exuberant children. We tested whether authoritative parenting style at the age of 5 has similar impacts on exuberance and child behavior problems in kindergarten. We found that this moderation was not significant, suggesting that early responsive parenting has a particularly unique impact on the association between exuberance and later behavior problems. We also tested the effects of other parenting styles and strategies during toddlerhood and found no significant interaction with exuberant temperament. It is possible that when children are toddlers, responsiveness is important for the development of self-regulation or

behavioral regulation and later reduces behavior problems for those children at risk in the classroom, which would be consistent with literature on responsive, sensitive, and supportive parenting (Eisenberg et al., 2010; Landry et al., 2001; Perry et al., 2013). When children get older, other parenting styles or strategies might have a greater impact on child outcomes, although our analyses of authoritative parenting at age 5 rule out that particular parenting style. Our results on the timing and specificity of responsive parenting could be especially important for researchers, teachers, or school administrators who hope to design or implement school readiness programs that seek to work with parents and children together.

### **Limitations and Future Directions**

While the current study has a number of strengths, there are some limitations of which to take note. The study involved both observations and questionnaires completed by multiple reporters. The scope of the current study is limited given the partial longitudinal design. Future studies should assess temperament and maternal responsiveness at multiple time-points to determine the impact of stability or change in temperament and parenting behaviors on classroom behaviors. Further, the current study did not assess the impact of maternal responsiveness on concurrent or subsequent self-regulation in children. Future work could assess how maternal responsiveness might improve self-regulation to explain school readiness in children. Finally, the sample in the current study was relatively homogeneous (e.g., largely white, middle class, and low risk), which puts into question the generalizability of the findings. More work is needed to determine whether exuberance presents as a risk for behavior problems among a more heterogeneous sample with other risks (e.g., lower-income, high poverty).

### **Implications**

The current study provides additional evidence for the risks associated with early temperamental dispositions. Specifically, exuberance in toddlers was associated with more behavior problems as reported by the children's kindergarten teachers. In addition, we were able to show that when mothers were more responsive to their toddlers, exuberance no longer predicted these classroom behavior problems. Our results suggest that parent-toddler interactions are especially important for socioemotional adjustment in kindergarten for children who are at risk for poor school readiness. This improvement in school readiness can have lasting effects on socioemotional and academic outcomes and success.

The study also has implications for early school readiness interventions. A number of interventions have been developed to address particular temperament risks (e.g., INSIGHTS; TURTLE) and these interventions are often given to children in preschool or elementary school (Chronis-Tuscano et al., 2015; McCormick, O'Connor, Cappella, & McClowry, 2015). INSIGHTS, for instance, is delivered in the classroom, with teacher and parent components to help address the socioemotional needs of children with different temperaments (McCormick et al., 2015). The current study can help intervention developers improve parent components by addressing parental responsiveness. Further, our findings and our post-hoc analyses suggest that parents might have an even larger impact on socioemotional skills when children are toddlers before they enter school. Intervention developers could consider designing earlier interventions when children are toddlers and these skills are first developing.

## **Conclusion**

Understanding which children are at risk for poor adjustment in school and under what circumstances these risks manifest is essential to help improve school readiness and to promote healthy adjustment in children's school transitions. The current study found that while exuberant

temperament predicts higher behavior problems in kindergarten, maternal responsiveness during toddlerhood can protect against this risk. While there are a number of interventions that address both temperamental risks and parenting for school-age children, our findings suggest that it would be beneficial to intervene earlier during toddlerhood when socioemotional skills first develop. Early intervention could help set these children up for positive early experiences in the classroom, which can have far-reaching effects on their later academic success.

## References

- Abulizi, X., Pryor, L., Michel, G., Melchior, M., van der Waerden, J., & on behalf of The EDEN Mother-Child Cohort Study Group. (2017). Temperament in infancy and behavioral and emotional problems at age 5.5: The EDEN mother-child cohort. *PLOS ONE*, 12(2), e0171971. <https://doi.org/10.1371/journal.pone.0171971>
- Bernier, A., Carlson, S. M., & Whipple, N. (2010). From external regulation to self-regulation: Early parenting precursors of young children's executive functioning. *Child Development*, 81(1), 326–339.
- Bierman, K. L., Domitrovich, C. E., Nix, R. L., Gest, S. D., Welsh, J. A., Greenberg, M. T., Blair, C., Nelson, K.E., & Gill, S. (2008). Promoting academic and social-emotional school readiness: The Head Start REDI program. *Child Development*, 79(6), 1802–1817.
- Bierman, Karen L.; Nix, Robert L.; Domitrovich, Celene E.; Welsh, Janet A.; Gest, Scott D.. In *Health and education in early childhood: Predictors, interventions, and policies*, by Reynolds, Arthur J. (ed.) ; Rolnick, Arthur J. (ed.) ; Temple, Judy A. (ed.) . 208-233, Chapter xviii, 404 Pages. New York, NY, US: Cambridge University Press, 2014.
- Bierman, K. L., Welsh, J. A., Heinrichs, B. S., Nix, R. L., & Mathis, E. T. (2015). Helping head start parents promote their children's kindergarten adjustment: The research-based developmentally informed parent program. *Child Development*, 86(6), 1877–1891. <https://doi.org/10.1111/cdev.12448>
- Blair, C., & Raver, C. C. (2015). School readiness and self-regulation: A developmental psychobiological approach. *Annual Review of Psychology*, 66(1), 711–731. <https://doi.org/10.1146/annurev-psych-010814-015221>



- Buss, K. A. (2011). Which fearful toddlers should we worry about? Context, fear regulation, and anxiety risk. *Developmental Psychology*, 47(3), 804–819. <https://doi.org/10.1037/a0023227>
- Buss, K. A., Davis, E. L., Ram, N., & Coccia, M. (2017). Dysregulated Fear, Social Inhibition, and Respiratory Sinus Arrhythmia: A Replication and Extension. *Child Development*. <https://doi.org/10.1111/cdev.12774>
- Buss, K. A., & Goldsmith, H. H. (2000). Manual and normative data for the Laboratory Temperament Assessment Battery—Toddler version. *Psychology Department Technical Report, University of Wisconsin, Madison*.
- Chronis-Tuscano, A., Rubin, K. H., O'Brien, K. A., Coplan, R. J., Thomas, S. R., Dougherty, L. R., Cheah, C.S.L., Watts, K., Heverly-Fitt, S., Huggins, S.L., Menzer, M., Schulz Begle, A., & Wimsatt, M. (2015). Preliminary evaluation of a multimodal early intervention program for behaviorally inhibited preschoolers. *Journal of Consulting and Clinical Psychology*, 83(3), 534–540. <https://doi.org/10.1037/a0039043>
- Cipriano, E. A., & Stifter, C. A. (2010). Predicting preschool effortful control from toddler temperament and parenting behavior. *Journal of Applied Developmental Psychology*, 31(3), 221–230. <https://doi.org/10.1016/j.appdev.2010.02.004>
- Cole, P. M., Tan, P. Z., Hall, S. E., Zhang, Y., Crnic, K. A., Blair, C. B., & Li, R. (2011). Developmental changes in anger expression and attention focus: Learning to wait. *Developmental Psychology*, 47(4), 1078–1089. <https://doi.org/10.1037/a0023813>
- Davis, E. L., & Buss, K. A. (2012). Moderators of the relation between shyness and behavior with peers: Cortisol dysregulation and maternal emotion socialization. *Social Development*, 21(4), 801–820. <https://doi.org/10.1111/j.1467-9507.2011.00654.x>

- Deater-Deckard, K., Mullineaux, P. Y., Petrill, S. A., & Thompson, L. A. (2009). Effortful Control, Surgency, and reading skills in middle childhood. *Reading and Writing*, 22(1), 107–116.  
<https://doi.org/10.1007/s11145-007-9111-9>
- Degnan, K. A., Hane, A. A., Henderson, H. A., Moas, O. L., Reeb-Sutherland, B. C., & Fox, N. A. (2011). Longitudinal stability of temperamental exuberance and social-emotional outcomes in early childhood. *Developmental Psychology*, 47(3), 765–780. <https://doi.org/10.1037/a0021316>
- Denham, S. A., Bassett, H. H., Zinsser, K., & Wyatt, T. M. (2014). How preschoolers' social-emotional learning predicts their early school success: Developing theory-promoting, competency-based assessments. *Infant and Child Development*, 23(4), 426–454.  
<https://doi.org/10.1002/icd.1840>
- Denham, S. A., & Brown, C. (2010). Plays nice with others: Social-emotional learning and academic success. *Early Education & Development*, 21(5), 652–680.  
<https://doi.org/10.1080/10409289.2010.497450>
- Dennis, T. (2006). Emotional self-regulation in preschoolers: The interplay of child approach reactivity, parenting, and control capacities. *Developmental Psychology*, 42(1), 84–97.  
<https://doi.org/10.1037/0012-1649.42.1.84>
- Dollar, J. M., & Buss, K. A. (2014). Approach and positive affect in toddlerhood predict early childhood behavior problems. *Social Development*, 23(2), 267–287.  
<https://doi.org/10.1111/sode.12062>
- Dollar, J. M., Stifter, C. A., & Buss, K. A. (2017). Exuberant and inhibited children: Person-centered profiles and links to social adjustment. *Developmental Psychology*, 53(7), 1222–1229.  
<https://doi.org/10.1037/dev0000323>

- Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P., Pagani, L.S., Feinstein, L., Engel, M., Brooks-Gunn, J., Sexton, H., Duckworth, K., & Japel, C. (2007). School readiness and later achievement. *Developmental Psychology*, 43(6), 1428–1446.  
<https://doi.org/10.1037/0012-1649.43.6.1428>
- Eisenberg, N., Spinrad, T. L., & Eggum, N. D. (2010). Emotion-related self-regulation and its relation to children's maladjustment. *Annual Review of Clinical Psychology*, 6(1), 495–525.  
<https://doi.org/10.1146/annurev.clinpsy.121208.131208>
- Eisenberg, N., Valiente, C., & Eggum, N. D. (2010). Self-Regulation and School Readiness. *Early Education & Development*, 21(5), 681–698. <https://doi.org/10.1080/10409289.2010.497451>
- Eisenberg, N., Zhou, Q., Spinrad, T. L., Valiente, C., Fabes, R. A., & Liew, J. (2005). Relations among positive parenting, children's effortful control, and externalizing problems: A three-wave longitudinal study. *Child Development*, 76(5), 1055–1071.
- Flook, L., Goldberg, S. B., Pinger, L., & Davidson, R. J. (2015). Promoting prosocial behavior and self-regulatory skills in preschool children through a mindfulness-based kindness curriculum. *Developmental Psychology*, 51(1), 44–51. <https://doi.org/10.1037/a0038256>
- Frick, P. J., & Morris, A. S. (2004). Temperament and developmental pathways to conduct problems. *Journal of Clinical Child & Adolescent Psychology*, 33(1), 54–68.  
[https://doi.org/10.1207/S15374424JCCP3301\\_6](https://doi.org/10.1207/S15374424JCCP3301_6)
- Goldsmith, H. H., Buss, A. H., Plomin, R., Rothbart, M. K., Thomas, A., Chess, S., Hinde, R.A., & McCall, R. B. (1987). Roundtable: What is temperament? Four approaches. *Child Development*, 58(1), 30–49.
- Goldsmith, H. H., Reilly, H. H., Lemery, K. S., Longley, S., & Prescott, A. (1994). Manual for laboratory temperament assessment battery (technical report). *Madison, WI: University of Wisconsin, Department of Psychology*.

- Goldsmith, H.H., (1996). Studying Temperament via Construction of the Toddler Behavior Assessment Questionnaire. *Child Development*, 67, 218-235.
- Graham, J. W., Olchowski, A. E., & Gilreath, T. D. (2007). How many imputations are really needed? Some practical clarifications of multiple imputation theory. *Prevention Science*, 8(3), 206–213.  
<https://doi.org/10.1007/s11121-007-0070-9>
- Graziano, P. A., Reavis, R. D., Keane, S. P., & Calkins, S. D. (2007). The role of emotion regulation in children's early academic success. *Journal of School Psychology*, 45(1), 3–19.  
<https://doi.org/10.1016/j.jsp.2006.09.002>
- Haley, D. W., & Stansbury, K. (2003). Infant stress and parent responsiveness: regulation of physiology and behavior during still-face and reunion. *Child Development*, 74(5), 1534–1546.
- Jaffe, M., Gullone, E., & Hughes, E. K. (2010). The roles of temperamental dispositions and perceived parenting behaviours in the use of two emotion regulation strategies in late childhood. *Journal of Applied Developmental Psychology*, 31(1), 47–59.  
<https://doi.org/10.1016/j.appdev.2009.07.008>
- Jahromi, L. B., Putnam, S. P., & Stifter, C. A. (2004). Maternal regulation of infant reactivity from 2 to 6 months. *Developmental Psychology*, 40(4), 477–487. <https://doi.org/10.1037/0012-1649.40.4.477>
- Kagan, J., & Fox, N. A. (2007). Biology, Culture, and Temperamental Biases. In W. Damon & R. M. Lerner (Eds.), *Handbook of Child Psychology*. Hoboken, NJ, USA: John Wiley & Sons, Inc.  
<https://doi.org/10.1002/9780470147658.chpsy0304>
- Kochanska, G., Aksan, N., & Joy, M. E. (2007). Children's fearfulness as a moderator of parenting in early socialization: Two longitudinal studies. *Developmental Psychology*, 43(1), 222–237.  
<https://doi.org/10.1037/0012-1649.43.1.222>

- Konold, T. R., & Pianta, R. C. (2005). Empirically-derived, person-oriented patterns of school readiness in typically-developing children: Description and prediction to first-grade achievement. *Applied Developmental Science*, 9(4), 174–187. [https://doi.org/10.1207/s1532480xads0904\\_1](https://doi.org/10.1207/s1532480xads0904_1)
- Landry, S. H., Smith, K. E., Swank, P. R., Assel, M. A., & Vellet, S. (2001). Does early responsive parenting have a special importance for children's development or is consistency across early childhood necessary? *Developmental Psychology*, 37(3), 387–403. <https://doi.org/10.1037//0012-1649.37.3.387>
- Landry, S. H., Smith, K. E., Swank, P. R., & Guttentag, C. (2008). A responsive parenting intervention: The optimal timing across early childhood for impacting maternal behaviors and child outcomes. *Developmental Psychology*, 44(5), 1335–1353. <https://doi.org/10.1037/a0013030>
- Lengua, L. J. (2006). Growth in temperament and parenting as predictors of adjustment during children's transition to adolescence. *Developmental Psychology*, 42(5), 819–832. <https://doi.org/10.1037/0012-1649.42.5.819>
- Lengua, L. J., & Kovacs, E. A. (2005). Bidirectional associations between temperament and parenting and the prediction of adjustment problems in middle childhood. *Journal of Applied Developmental Psychology*, 26(1), 21–38. <https://doi.org/10.1016/j.appdev.2004.10.001>
- Liew, J. (2012). Effortful control, executive functions, and education: Bringing self-regulatory and social-emotional competencies to the table. *Child Development Perspectives*, 6(2), 105–111. <https://doi.org/10.1111/j.1750-8606.2011.00196.x>
- Mathis, E. T. B., & Bierman, K. L. (2015). Effects of parent and child pre-intervention characteristics on child skill acquisition during a school readiness intervention. *Early Childhood Research Quarterly*, 33, 87–97. <https://doi.org/10.1016/j.ecresq.2015.07.002>

- McCormick, M. P., O'Connor, E. E., Cappella, E., & McClowry, S. G. (2015). Getting a good start in school: Effects of INSIGHTS on children with high maintenance temperaments. *Early Childhood Research Quarterly*, 30, 128–139. <https://doi.org/10.1016/j.ecresq.2014.10.006>
- Perry, N. B., Nelson, J. A., Swingler, M. M., Leerkes, E. M., Calkins, S. D., Marcovitch, S., & O'Brien, M. (2013). The relation between maternal emotional support and child physiological regulation across the preschool years. *Developmental Psychobiology*, 55(4), 382-394.
- Putnam, S. P., & Stifter, C. A. (2005). Behavioral approach/inhibition in toddlers: Prediction from infancy, positive and negative affective components, and relations with behavior problems. *Child Development*, 76(1), 212–226. <https://doi.org/10.1111/j.1467-8624.2005.00840.x>
- Rains, C. (2003). Teacher Observation of Child Adaptation-Revised (TOCA-R). Fast Track Project Technical Report.
- Rimm-Kaufman, S. E., Curby, T. W., Grimm, K. J., Nathanson, L., & Brock, L. L. (2009). The contribution of children's self-regulation and classroom quality to children's adaptive behaviors in the kindergarten classroom. *Developmental Psychology*, 45(4), 958–972. <https://doi.org/10.1037/a0015861>
- Rimm-Kaufman, S. E., Pianta, R. C., & Cox, M. J. (2000). Teachers' judgments of problems in the transition to kindergarten. *Early Childhood Research Quarterly*, 15(2), 147–166.
- Robinson, C. C., Mandleco, B., Olsen, S. F., & Hart, C. H. (1995). Authoritative, authoritarian, and permissive parenting practices: Development of a new measure. *Psychological reports*, 77(3), 819-830.
- Root, A. K., & Stifter, C. (2010). Temperament and maternal emotion socialization beliefs as predictors of early childhood social behavior in the laboratory and classroom. *Parenting*, 10(4), 241–257. <https://doi.org/10.1080/15295192.2010.492035>

- Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigations of temperament at three to seven years: The Children's Behavior Questionnaire. *Child Development*, 72(5), 1394–1408.
- Rothbart, M. K., & Bates, J. E. (2006). Temperament. *Handbook of Child Psychology*. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1002/9780470147658.chpsy0303/full>
- Sanson, A., Letcher, P., Smart, D., Prior, M., Toumbourou, J. W., & Oberklaid, F. (2009). Associations between early childhood temperament clusters and later psychosocial adjustment. *Merrill-Palmer Quarterly*, 55(1), 26–54.
- Smith, C. L., Calkins, S. D., Keane, S. P., Anastopoulos, A. D., & Shelton, T. L. (2004). Predicting Stability and Change in Toddler Behavior Problems: Contributions of Maternal Behavior and Child Gender. *Developmental Psychology*, 40(1), 29–42. <https://doi.org/10.1037/0012-1649.40.1.29>
- Spinrad, T. L., Eisenberg, N., Gaertner, B., Popp, T., Smith, C. L., Kupfer, A., Greving, K., Liew, J., & Hofer, C. (2007). Relations of maternal socialization and toddlers' effortful control to children's adjustment and social competence. *Developmental Psychology*, 43(5), 1170–1186. <https://doi.org/10.1037/0012-1649.43.5.1170>
- Spinrad, T. L., Stifter, C. A., Donelan-McCall, N., & Turner, L. (2004). Mothers' regulation strategies in response to toddlers' affect: Links to later emotion self-regulation. *Social Development*, 13(1), 40–55.
- Stifter, C. A., Putnam, S., & Jahromi, L. (2008). Exuberant and inhibited toddlers: Stability of temperament and risk for problem behavior. *Development and Psychopathology*, 20(02). <https://doi.org/10.1017/S0954579408000199>

- Van Buuren, S., & Groothuis-Oudshoorn, K. (2011). mice: Multivariate imputation by chained equations in R. *Journal of Statistical Software*, 45(3). Retrieved from <http://doc.utwente.nl/78938/>
- Zhou, Q., Hofer, C., Eisenberg, N., Reiser, M., Spinrad, T. L., & Fabes, R. A. (2007). The developmental trajectories of attention focusing, attentional and behavioral persistence, and externalizing problems during school-age years. *Developmental Psychology*, 43(2), 369–385. <https://doi.org/10.1037/0012-1649.43.2.369>



Table 1

*Raw mean, standard deviation, minimum and maximum, and missingness for boldness, positive affect, maternal involvement, and total problems measures.*

<u>Variable</u>	<u><i>M</i></u>	<u><i>SD</i></u>	<u>Min/Max</u>	<u>Missingness %</u>
Observed Boldness (Age 24 months)	2.05	0.55	1.00/3.67	0%
Observed Positive Affect (Age 24 months)	2.53	0.72	1.00/4.17	0%
Observed Involvement (Age 24 months)	0.06	0.07	0.00/0.44	0.8%
PPQ Warmth-Involvement (Age 24 months)	4.41	0.34	3.64/5.00	9.7%
TOCA-R Total Problems (Age 5 years)	0.42	0.50	0.00/2.31	48.3%

Table 2

*Bivariate correlations between mother responsiveness, exuberance, and classroom behavior problems and the covariates fearful temperament, authoritative parenting, and income.*

<u>Variable</u>	<u>M</u>	<u>SD</u>	<u>1.</u>	<u>2.</u>	<u>3.</u>	<u>4.</u>	<u>5.</u>	<u>6.</u>	<u>7.</u>
1. Income Level	5.89	1.57	1.00						
2. TBAQ Object Fear	2.47	0.82	-0.05	1.00					
3. TBAQ Social Fear	3.72	1.06	-0.001	0.50**	1.00				
4. PPQ Authoritative	4.12	0.48	-0.17	0.02	-0.04	1.00			
5. Responsiveness	0.00	1.00	-0.02	0.08	0.08	0.35**	1.00		
6. Exuberance	0.00	1.00	-0.02	-0.12	-0.21*	0.07	-0.31**	1.00	
7. Classroom Problems	0.40	0.47	-0.12	-0.12	-0.09	-0.06	-0.24	0.32*	1.00

*Note: \* $p < 0.05$ . \*\*  $p < 0.001$ .*

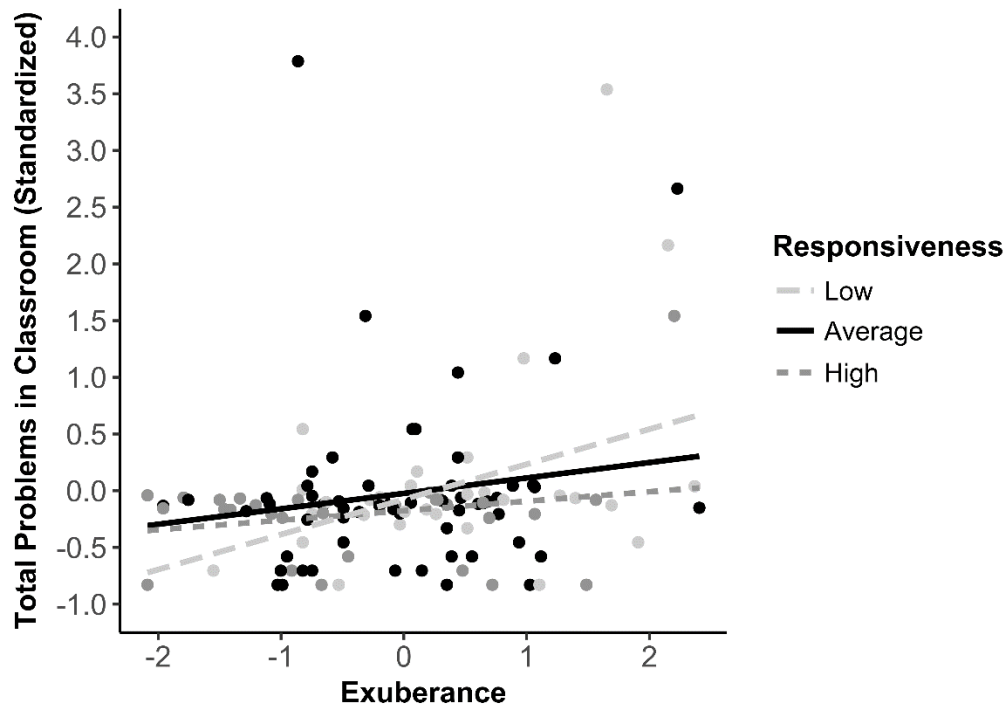
Table 3.

*Multiple regression standardized estimates assessing the relation between exuberance, responsiveness, and their interaction on teacher reported behavior problems in the classroom.*

<u>Total Behavior Problems in Classroom</u>								
	<u>Model 1</u>				<u>Model 2</u>			
	$\beta$	<u>SE</u>	<i>t</i>	<i>p</i>	$\beta$	<u>SE</u>	<i>t</i>	<i>p</i>
Intercept	0.15	0.53	0.27	0.79	0.27	1.02	0.26	0.79
Exuberance	0.17*	0.08	2.07	0.04	0.14†	0.08	1.67	0.10
Responsiveness					-0.13	0.09	-1.43	0.16
Exuberance X Responsiveness					-0.17*	0.08	-2.07	0.04
$R^2$		0.06				0.12		
<i>F</i>		1.26				1.55		

Note: †<0.10,\* $p < 0.05$ .

Figure 1. Exuberant children whose mothers are more responsive are reported as having fewer problems in the classroom.



Note: Low =  $-0.5 SD$ ; Average = Mean; High =  $+0.5 SD$ ; TOCA – R = Teacher Observation of Child Adaptation – Revised.